

[Print](#)[Close](#)

Marshall Star, March 21, 2012 Edition

MARSHALL STAR

In This Week's Star  ([Click to Expand](#))

- › [100 Years of Possibility: Celebrating the Centennial Birthday of Dr. Wernher von Braun](#)
- › [Von Braun Exhibit on Display at U.S. Space & Rocket Center](#)
- › [Celebrating Von Braun's Centennial: Marshall Exchange to Host Tribute March 23](#)
- › [UAHuntsville to Commemorate 100th Birthday of Rocket Pioneer Von Braun](#)
- › [Space Launch System Tests Booster Sub-Scale Solid Rocket Motor](#)
- › [NASA seeks SLS Advanced Development Solutions](#)
- › [Marshall Center to host NASA Woman-Owned Small Business Industry Day on March 29](#)
- › [Abell 383: An Elusive Subject](#)
- › [Tour the Planets: Jupiter and Venus Conjunction Live Chat](#)

100 Years of Possibility: Celebrating the Centennial Birthday of Dr. Wernher von Braun

"I have learned to use the word 'impossible' with the greatest caution." -- Wernher von Braun

March 23 marks the 100th anniversary of the birth of Dr. Wernher von Braun, a father of modern rocketry, an early champion of human space exploration and the first director of the Marshall Space Flight Center.

Image right: Dr. Wernher von Braun, first director of the Marshall Center, in his office, circa 1960. (NASA/MSFC)

"Dr. von Braun was a model of excellence -- in innovative engineering, in communicating his passion for his work and in his leadership of our historic efforts to burst the bonds of gravity and travel beyond the confines of Earth," said Marshall Center Acting Director Gene Goldman. "His stature today remains as great as that of the towering rockets that sprang from his vision, and the limitless path they set us on."

Born in Wirsitz, Germany, on March 23, 1912, von Braun became a space buff in childhood, devouring the science fiction of Jules Verne and H.G. Wells. After reading noted physicist Hermann Oberth's 1923 report "Die Rakete zu den Planetenräumen" ("By Rocket to Space"), however, he left fiction behind, and took up the study of calculus and trigonometry so he could master the physics of rocketry.





By the time he received his doctorate from the University of Berlin in 1934, von Braun already was working for the German military, assisting Oberth in building and firing small, liquid-fueled rockets. During World War II, he led rocket research at the German propulsion laboratory in Peenemünde on the Baltic coast.

Image left: Von Braun cuts a cake to celebrate his 50th birthday in 1962. Looking on is U.S. Rep. Robert Jones of Alabama. (NASA/Marshall)

But von Braun wanted to do more than develop weapons. He wanted to use rocket power to fly to space, to create a new frontier for scientific exploration and, eventually, peaceful human colonization of the stars.

With these goals in mind, as the war ended in Europe, [he and key members of his team](#) came to the United States to advise the military on developing its own rocket program. The effort initially was based at Fort Bliss, Texas, with launch testing conducted at White Sands Proving Ground, N.M.

In 1950, von Braun and his team moved to Huntsville to oversee rocket development for the U.S. Army at Redstone Arsenal. There, they embarked on the development of the Jupiter rocket -- work which earned the growing urban community its most famous nickname: "Rocket City."

Image right: This photograph was released by Marshall on July 26, 1969. Von Braun and his wife, Maria, join the fun at a picnic and dance celebrating man's first landing on the moon. (NASA/Marshall)



By the time [the Marshall Center opened](#) on Redstone Arsenal in 1960, von Braun had been a naturalized U.S. citizen for five years. As Marshall's first director -- a post he held from July 1, 1960, to Jan. 27, 1970 -- he spearheaded development of NASA's [Mercury](#) and [Apollo](#) space programs. Without benefit of modern computers or the high-tech manufacturing tools integral to today's aerospace industry, the team built and tested the most powerful engines the world had ever seen, capable of hurling massive vehicles out of the atmosphere.

Von Braun also tirelessly sought to fire the public's imagination and interest in spaceflight, delivering passionate, enthralling presentations in a variety of high-profile, public mediums -- from an historic series of visionary articles about future space travel in *Collier's Weekly* to [thrilling documentary features for Walt Disney](#).



His crowning achievement came in November 1967, when the massive [Saturn V rocket](#) was successfully launched for the first time. A year later, this monument to human accomplishment would propel the first human voyage to the moon, and explorers would walk there for the first time on July 21, 1969.

Image left: In this photo dated Nov. 14, 1967, von Braun is suited as he enters a giant water tank used as a neutral buoyancy simulator. Weighted to a neutrally buoyant condition, he performed tasks under water in simulated weightless conditions. (NASA/Marshall)

In 1970, von Braun moved his family to Washington to lead strategic planning for the agency. He retired from NASA in 1972.

Von Braun died in Alexandria, Va., on June 16, 1977. That same year, the first [space shuttle](#) began flight tests. That successful, 30-year program -- and ongoing scientific study aboard the orbiting [International Space Station](#), the realization of another of von Braun's early ideas -- carry on his remarkable legacy of ingenuity and invention.

[Read more](http://history.msfc.nasa.gov/vonbraun/index.html) about von Braun in the Marshall Center's History Office archives at <http://history.msfc.nasa.gov/vonbraun/index.html>.

[› Back to Top](#)

Von Braun Exhibit on Display at U.S. Space & Rocket Center

Historians and exhibit specialists at the Marshall Space Flight Center are among those supporting an exhibit at the U.S. Space & Rocket Center, showcasing the life of Dr. Wernher von Braun in honor of his 100th birthday on March 23.

Image right: The exhibit includes a living room set up with Dr. Wernher von Braun's recliner and other furniture that came from a couple of the family's homes in Huntsville. (U.S. Space & Rocket Center)



The exhibit is titled "100 Years of Von Braun: His American Journey." Von Braun served as the first director of the Marshall Center from its founding in 1960 until his transfer to NASA Headquarters in 1970. The exhibit will run through May. In May, the exhibit is expected to begin an extensive traveling schedule, possibly starting in Peenemunde, Germany, site of von Braun's early rocket development efforts.

The exhibition covers von Braun's American experience, beginning with his surrender to U.S. forces after World War II, and continuing through his passing in 1977. It also includes information about his many technical achievements, not only with NASA, but with the U.S. Army and private industry as well. Visitors can explore his vision through artifacts, models of various spacecraft (both real and conceptual), photographs and artwork, and multimedia displays featuring his speeches and interviews with him and about him.

In 1960, von Braun's rocket development team transferred from the Army to a newly established NASA facility in Huntsville and received a mandate to build the giant Saturn rockets. Accordingly, von Braun became director of Marshall and the chief architect of the Saturn V launch vehicle, the super booster that would propel Americans to the moon.

Von Braun also became one of the most prominent spokesmen of space exploration in the United States during the 1950s. In 1970, NASA leadership asked von Braun to move to Washington to head the strategic planning effort for the agency. He left his home in Huntsville, but in 1972, he decided to retire from NASA and work for Fairchild Industries of Germantown, Md. He died in Alexandria, Va., on June 16, 1977.

The first stop in the exhibition traces 30 years of von Braun's life in America, from the surrender to U.S. forces near the end of World War II to his death in 1977. It features a wall covered with extracts about von Braun, milestones in his life, a list of his publications and even a map of Huntsville showing locations named in his honor.

The exhibit also includes a life-size photograph of about 100 members of "Operation Paperclip," the effort to bring more than 100 German scientists, engineers and technicians to the United States, along with V-2 and Redstone rocket engines. Display cases hold smaller artifacts like von Braun's personal flight log and his ID cards during his time at Fort Bliss, Texas, where the German team first arrived in the United States before moving on to Huntsville in 1950. There are artifacts from his career, including a shovel from the Marshall Center dedication ceremony Sept. 8, 1960, and a desk calendar marking the date of the Apollo 11 lunar landing in July 1969.

In addition to covering the history of von Braun's time, the exhibit also features a unique look at some of the more personal aspects of his life, including his hobbies, his family, his celebrity status and his daring visions of the future.

There's a bicycle on display believed to be the same one ridden by von Braun's younger brother, Magnus, as he searched for American troops to arrange the German rocket team's surrender.

The more personal effects include a wedding photograph of von Braun and his wife, Maria, taken in 1947, some trophies from his hunting trips and copies of musical compositions created by von Braun, who played the piano and cello. A living room is set up with von Braun's recliner and other furniture that came from a couple of the family's homes in Huntsville.

Scattered throughout the exhibition are multimedia displays with von Braun's speeches and interviews.

On March 23, the Space & Rocket Center will host a dinner honoring von Braun.

Dr. Margrit von Braun, von Braun's daughter, will speak beneath a Saturn V rocket, her father's crowning achievement in landing the United States on the moon. Members of von Braun's family will tour the Marshall Center that day to see some of the legacy buildings and laboratories built by him that today still stand as a testimony to his vision and leadership.

[› Back to Top](#)

Celebrating Von Braun's Centennial: Marshall Exchange to Host Tribute March 23

The Marshall Space Flight Center team will commemorate the 100th birthday of Dr. Wernher von Braun on March 23.

Marshall Center Historian Mike Wright will present a tribute to von Braun at 10 a.m. in Building 4203, Room 1201, followed by a celebration at 11 a.m. on the 4203 cafeteria patio. There, team members can listen to music by the U.S. Army Materiel Command's Brass Machine Band, enjoy a slice of birthday cake and browse exhibits and photo displays recounting the historic work of von Braun and his team to launch the first American explorers into space and to the moon.

Historical TV footage and archive stills of von Braun and the work of the early Marshall Center team will play all day on Employee TV. Team members may visit the Heritage Gallery, open 8 a.m. to 4 p.m., to see displays dedicated to von Braun's life and work.

This celebration is sponsored by the Marshall Exchange.

[› Back to Top](#)

UAHuntsville to Commemorate 100th Birthday of Rocket Pioneer Von Braun

The University of Alabama in Huntsville is celebrating the 100th birthday of Marshall Space Flight Center's first center director, rocket pioneer Dr. Wernher von Braun, at 1:30 p.m., March 22, at the M. Louis Salmon Library. The theme will be "Wernher von Braun: A Visionary's Influence on UAHuntsville."

Slated to discuss von Braun's interest in education, as well as his successful efforts at encouraging the state of Alabama to create a research institute at UAHuntsville, will be Frederick Ordway, a space scientist and author of books on spaceflight; Dave Christensen, an aerospace consultant and a member of von Braun's original team; and Chuck Lundquist, who worked with the U.S. Army with von Braun and is now a scientist at UAHuntsville.

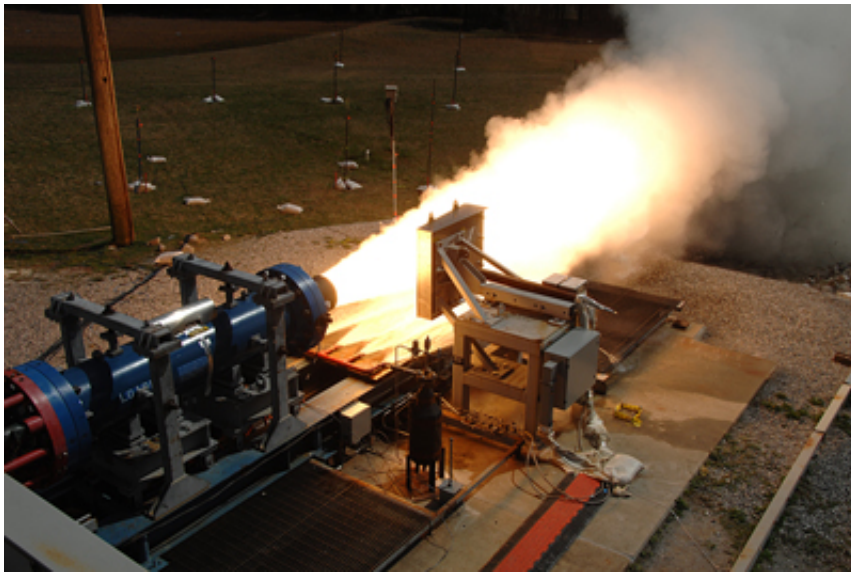
Space hardware from the library's archives will be on display and film clips of von Braun will be played in Room 111.

The public is invited to attend. For more information, visit <http://www.uah.edu/events/1980-uahuntsville-joins-city-in-commemorating-100th-birth-date-of-rocket-pioneer-von-braun>.

[› Back to Top](#)

Space Launch System Tests Booster Sub-Scale Solid Rocket Motor

By Megan Davidson



A sub-scale solid rocket motor designed to mimic NASA's Space Launch System, or SLS, booster design was successfully tested March 14 by engineers at the Marshall Space Flight Center. The 20-second firing tested new insulation materials on the 24-inch-diameter, 109-inch-long motor. The motor is a scaled down, low-cost replica of the solid rocket motors that will boost SLS off the launch pad.

Image left: It was three-two-one to brilliant fire as the Marshall Space Flight Center tested a small, solid rocket motor designed to mimic NASA's Space Launch System booster. The March 14 test provides a quick, affordable and effective way to evaluate a

new nozzle insulation material for the SLS solid rocket booster. (NASA/MSFC)

Marshall is leading the design and development of the SLS on behalf of the agency. The new heavy-lift launch vehicle will expand human presence beyond low-Earth orbit and enable new missions of exploration across the solar system.

The test will help engineers develop and evaluate analytical models and skills to assess future full-scale SLS solid rocket motor tests. The next full-scale test, Qualification Motor-1, or QM-1, is targeted for spring 2013. Two five-segment solid rocket motors, the world's largest at 154 feet long and 12 feet in diameter, will be used in the first two 70-metric-ton capability flights of SLS.

Previous ground tests of the motors included carbon insulation to protect the rocket's nozzle from the harsh environment and 5,000-degree temperatures to which it is exposed. QM-1 will include a new insulation material, provided by a new vendor, to line the motor's nozzle.

"Test firing small motors at Marshall provides a quick, affordable and effective way to evaluate the new nozzle liner's performance," said Scott Ringel, a Marshall engineer and the design lead for this test. "We have sophisticated analytic and computer modeling tools that tell us whether the new nozzle insulation will perform well, but nothing gives us better confidence than a hot-fire test."

The test also includes several secondary objectives. The team introduced an intentional defect in the propellant with a tool designed to create a specific flaw size. By measuring the temperature inside the motor at the flaw location, the team hopes to gain a better understanding of the propellant's margin for error. Test data also will help the team better understand acoustics and vibrations resulting from the rocket motor's plume.

In addition, NASA's Engineering and Safety Center will use test data to measure a solid rocket motor's plume and how it reacts to certain materials.

Engineers from Marshall's Engineering Directorate designed the test motor with support from ATK Aerospace Systems of Huntsville. ATK of Brigham City, Utah, the prime contractor for the SLS booster, is responsible for designing and testing the SLS five-segment solid rocket motor.

For more information about SLS, visit: <http://www.nasa.gov/sls>

Davidson, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

NASA Seeks Space Launch System Advanced Development Solutions

By Amie Cotton

The Marshall Space Flight Center has issued a NASA Research Announcement (NRA) for advanced development proposals to support the nation's next heavy-lift rocket, the Space Launch System (SLS).

Image right: Artist concept shows NASA's Space Launch System rising from a launch pad. (NASA/MSFC)

NASA is soliciting proposals from industry and academia for innovative advanced development in areas including concept development, trades and analyses, propulsion, structures, materials, manufacturing, avionics and software. These efforts will focus on affordability and sustainability of the SLS as it evolves from the initial 70-metric ton block 1 vehicle to the block 1A configuration.



"We look forward to hearing from both industry and academia on advanced development solutions that will enable the full capability of the evolved Space Launch System," said Mindy Niedermeyer, the evaluation team chair. "It's an exciting time for NASA. These solutions will help bring humans farther in space than ever before by advancing the SLS design from the initial capability to subsequent block upgrades."

NASA anticipates making multiple awards in response to this solicitation with approximately \$48 million in total funding. Of this total amount, the funding anticipated for the base year (FY13) is \$22 million, with \$14.5 million for the first year option (FY14), and \$11.5 million for the second year option (FY15). Total funding to be allocated to academic awards for this NRA is approximately \$1.5 million per year. Individual academic awards are expected to be valued up to \$250,000 per year. The deadline to submit proposals is May 15.

To view the announcement and instructions for submissions, visit <http://prod.nais.nasa.gov/cgi-bin/eps/synopsis.cgi?acqid=149905>.

For more information about SLS, visit <http://www.nasa.gov/sls>.

Follow the Space Launch System on Facebook at <http://www.facebook.com/NASASLS> and Twitter at http://www.twitter.com/NASA_SLS.

Cotton, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

Marshall Center to host NASA Woman-Owned Small Business Industry Day on March 29

By Megan Davidson

Marshall Space Flight Center will host a NASA Woman-Owned Small Business Industry Day from 7:30 a.m. to 1:30 p.m., March 29, at the Huntsville Museum of Art at 300 Church St.

A full day of activities is planned for event participants, including a woman-owned small business legislation overview, and registration in the NASA vendor database. The database allows companies to register online to do business with NASA.

Businesses also will have the opportunity to sign up for one-on-one business matchmaking sessions to present their capabilities to Marshall prime contractors and NASA small business specialists. A "marketplace" will be open throughout the day for participants to meet with Marshall technical and procurement personnel, small business technical coordinators and prime contractors.

David Brock, small business specialist in Marshall's Office of Procurement, will give opening remarks at the industry day event.

"Today, woman-owned small businesses represent the fastest-growing business sector in the U.S. economy," Brock notes, "and is one of several government target groups having a government-wide statutory goal. The current woman-owned small business statutory goal is set at 5 percent of total federal procurement dollars, and NASA is placing high importance on achieving this goal for fiscal year 2012 and beyond. It is events like industry day that afford woman-owned small businesses the opportunity to learn more about the NASA marketplace."

Among those expected to attend are Glenn Delgado, associate administrator of NASA's Office of Small Business Programs in Washington; Robin Henderson, Marshall Center associate director; and Teresa Foley-Batts, policy manager in Marshall's Office of Procurement.

The event coincides with Women's History Month. It is celebrated annually in March and highlights the contributions of women to events in history and contemporary society.

For more information about the NASA Woman-Owned Small Business Industry Day, visit: <http://msfc-wbcna.eventbrite.com>.

Davidson, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

[› Back to Top](#)

Abell 383: An Elusive Subject

From nasa.gov



Two teams of astronomers have used data from the Marshall Space Flight Center-managed Chandra X-ray Observatory and other telescopes to map the distribution of dark matter in a galaxy cluster known as Abell 383, which is located about 2.3 billion light years from Earth. Not only were the researchers able to find where the dark matter lies in the two dimensions across the sky, they were also able to determine how the dark matter is distributed along the line of sight.

Image left: The X-ray data, in purple, from Chandra in the composite image show the hot gas, which is by far the dominant type of normal matter in the cluster. Galaxies are shown with the optical data from the Hubble Space Telescope, the Very Large Telescope

and the Sloan Digital Sky Survey, colored in blue and white. (X-ray: NASA/CXC/Caltech/A.Newman et al/Tel Aviv/A.Morandi & M.Limousin; Optical: NASA/STScI, ESO/VLT, SDSS)

Dark matter is invisible material that does not emit or absorb any type of light, but is detectable through its gravitational effects. Several lines of evidence indicate that there is about six times as much dark matter as "normal," or baryonic, matter in the universe. Understanding the nature of this mysterious matter is one of the outstanding problems in astrophysics.

Galaxy clusters are the largest gravitationally bound structures in the universe, and play an important role in research on dark matter and cosmology, the study of the structure and evolution of the universe. The use of clusters as dark matter and cosmological probes hinges on scientists' ability to use objects such as Abell 383 to accurately determine the three-dimensional structures and masses of clusters.

The recent work on Abell 383 provides one of the most detailed 3-D pictures yet taken of dark matter in a galaxy cluster. Both teams have found that the dark matter is stretched out like a gigantic football, rather than being spherical like a basketball, and that the point of the football is aligned close to the line of sight.

The X-ray data, colored in purple, from Chandra in the composite image shows the hot gas, which is by far the dominant type of normal matter in the cluster. Galaxies are shown with the optical data from the Hubble Space Telescope, the Very Large Telescope and the Sloan Digital Sky Survey, colored in blue and white.

Both teams combined the X-ray observations of the "normal matter" in the cluster with gravitational lensing information determined from optical data. Gravitational lensing -- an effect predicted by Albert Einstein -- causes the material in the galaxy cluster, both normal and dark matter, to bend and distort the optical light from background galaxies. The distortion is severe in some parts of the image, producing an arc-like appearance for some of the galaxies. In other parts of the image, the distortion is subtle and statistical analysis is used to study the distortion effects and probe the dark matter.

A considerable amount of effort has gone into studying the center of galaxy clusters, where the dark matter has the highest concentration and important clues about its behavior might be revealed. Both of the Abell 383 studies reported here continue that effort.

The team of Andrea Morandi from Tel Aviv University in Israel and Marceau Limousin from Université de Provence in France and University of Copenhagen in Denmark concluded that the increased concentration of the dark matter toward the center of the cluster is in agreement with most theoretical simulations. Their lensing data came from Hubble Space

Telescope images.

The team led by Andrew Newman of the California Institute of Technology in Pasadena and Tommaso Treu of the University of California in Santa Barbara used lensing data from the Hubble Space Telescope and the Japanese telescope Subaru, but added Keck observations to measure the velocities of stars in the galaxy in the center of the cluster, allowing for a direct estimate of the amount of matter there. They found evidence that the amount of dark matter is not peaked as dramatically toward the center as the standard cold dark matter model predicts. Their paper describes this as being the "most robust case yet" made for such a discrepancy with theory.

The contrasting conclusions reached by the two teams most likely stem from differences in the data sets and the detailed mathematical modeling used. One important difference is that because the Newman et al. team used velocity information in the central galaxy, they were able to estimate the density of dark matter at distances that approached as close as only 6,500 light years from the center of the cluster. Morandi and Limousin did not use velocity data and their density estimates were unable to approach as close to the cluster's center, reaching to within 80,000 light years.

Another important difference is that Morandi and Limousin used a more detailed model for the 3-D map of dark matter in the cluster. For example, they were able to estimate the orientation of the dark matter "football" in space and show that it is mostly edge-on, although slightly tilted with respect to the line of sight.

As is often the case with cutting-edge and complex results, further work will be needed to resolve the discrepancy between the two teams. In view of the importance of resolving the dark matter mystery, there will undoubtedly be much more research into Abell 383 and other objects like it in the months and years to come.

If the relative lack of dark matter in the center of Abell 383 is confirmed, it may show that improvements need to be made in our understanding of how normal matter behaves in the center of galaxy clusters, or it may show that dark matter particles can interact with each other, contrary to the prevailing model.

The Newman et al. paper was published in the Feb. 20, 2011, issue of the *Astrophysical Journal Letter*, and the Morandi and Limousin paper has been accepted for publication in the *Monthly Notices of the Royal Astronomical Society*. Other members of the Newman et al. team were Richard Ellis from the California Institute of Technology, and David Sand from Las Cumbres Global Telescope Network and the University of California in Santa Barbara.

[› Back to Top](#)

Tour the Planets: Jupiter and Venus Conjunction Live Chat

In late March, [Venus](#) and [Jupiter](#) will be in [conjunction](#) in the western skies, drawing closer to each other to create a beautiful visual duet for a few hours each evening.

Image right: At left are Jupiter and its moon, Io; right is a false-color Venus. (NASA)

This will be the best Venus-Jupiter conjunction for years to come. While bright to the unaided eye, they're even better when seen through a telescope -- and you can share NASA's view.



On March 25 from 7-9 p.m. CDT, NASA expert Melissa McGrath will answer your questions about the Venus-Jupiter

conjunction via a live Web chat. During the chat you can watch a color Ustream view of the planets as they brighten the night skies.

Joining the chat is easy. Simply return to [this page](#) a few minutes before 7 p.m. The chat module will appear at the bottom. After you log in, wait for the chat module to be activated, then ask your questions. The Ustream view of Venus and Jupiter also will appear on this page.

More about chat expert McGrath

McGrath is the chief scientist in the Science & Technology Office at the Marshall Space Flight Center. She has undergraduate degrees in physics and astronomy, and a doctorate in astronomy from the University of Virginia in Charlottesville. McGrath is a planetary scientist who specializes in studies of the gas giant planets and their satellites, particularly Io, Europa and Ganymede, the large satellites of Jupiter. She has been the principal investigator on numerous space- and ground-based science investigations, and has lectured worldwide on her scientific results. She also has extensive experience in science and technical management and leadership, having served as the chair of the American Astronomical Society's Division for Planetary Sciences; as an associate scientific editor for The Astronomical Journal; and deputy director of the Solar System Division at NASA Headquarters in Washington.

Find this article at:

<http://www.nasa.gov/centers/marshall/about/star/index.html>